Safety technique

Emergency Stop Module BG 5925 safemaster

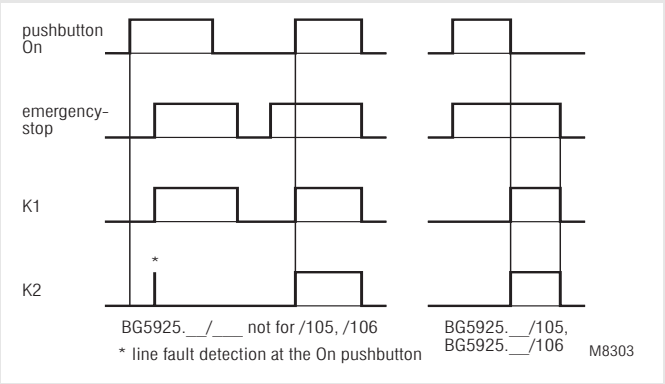
Now available for AC 230 V

DOLD

0224208

- According to EU directive for machines 98/37/EG
- According to IEC/EN 60 204-1, VDE 0113 part 1 (1998-11)
- Safety category 4 according to EN 954-1
- Output: max. 3 NO contacts, see contacts
- Single and 2-channel operation
- Line fault detection on On-button
- Manual restart or automatic restart when connecting the supply voltage, switch S2
- With or without cross fault monitoring in the E-stop loop, switch S1
- LED indicator for state of operation
- LED indicator for channel 1 and 2
- Removable terminal strips
- Wire connection: also 2 x 1,5 mm² stranded ferruled (isolated), DIN 46 228-1/-2/-3/-4 or 2 x 2,5 mm² stranded ferruled DIN 46 228-1/-2/-3
- Width 22,5 mm

Function diagram



Approvals and marking

BG ET 1) | SP C US Canada / USA 2) | CE

1) pending
2) see variants

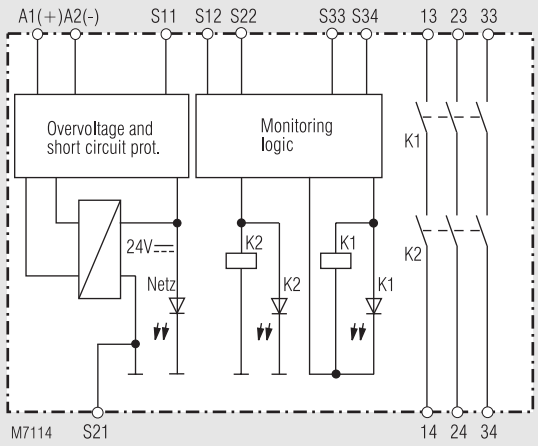
Applications

Protection of people and machines
- Emergency stop circuits on machines
- Monitoring of safety gates
- Control unit for lightbars

Indicators

upper LED:	on when supply connected
lower LEDs:	on when relay K1 and K2 energized

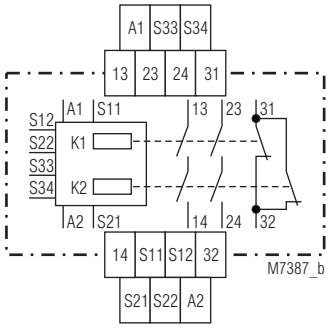
Block diagram



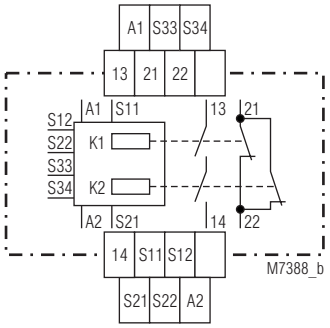
Notes

The category of a safety relevant part of a control circuit according to EN 954-1 can be different to the category 4 of the E-stop module BG 5925 depending on the external connections. For devices of safety category 4 (DIN EN 954-1) with contact outputs, the safety function has to be operated at least once a month.
Line fault detection on On-button:
The line fault detection is only active when S12 and S22 are switched simultaneously. If The On-button is closed before S12, S22 is connected to voltage (also when line fault across On-Button), the output contacts will not close.
A line fault across the On-button which occurred after activation of the relay, will be detected with the next activation and the output contacts will not close. If a line fault occurs after the voltage has been connected to S12, S22, the unit will be activated because this line fault is similar to the normal On-function. The gold plated contacts of the BG 5925 mean that this module is also suitable for switching small loads of 1 mVA - 7 VA, 1 mW - 7 W in the range 0,1 - 60 V, 1 - 300 mA. The contacts also permit the maximum switching current. However since the gold plating will be burnt off at this current level, the device is no longer suitable for switching small loads after this.
The terminal S21 permits the operation of the device in IT-systems with insulation monitoring, serves as a reference point for testing the control

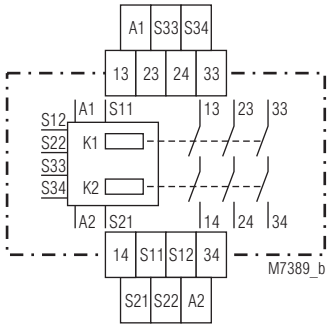
Circuit diagrams



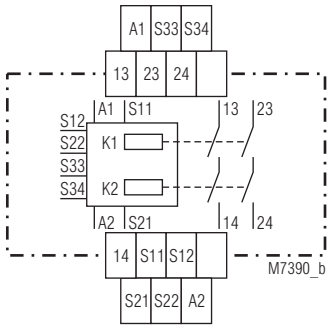
BG 5925.22



BG 5925.16

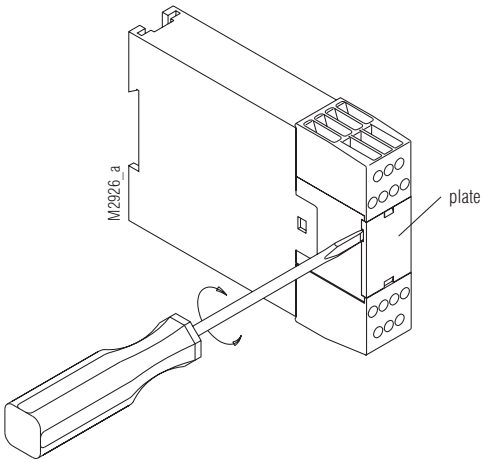


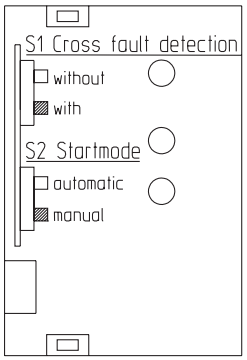
BG 5925.03



BG 5925.02

Unit programming





	S1 available in unit	S2 available in unit
BG 5925 BG 5925._ _/101	jes	jes
BG 5925._ _/105 BG 5925._ _/106	no	jes
BG 5925._ _/113 BG 5925._ _/114	no	no

Disconnect unit before setting of S1
Drawing shows setting at the state of delivery

Notes

voltage and is used to connect the E-stop loop when cross fault monitoring is selected.
Connecting the terminal S21 to the protective ground bridges the internal short-circuit protection of Line A2 (-). The short-circuit protection of line A1 (+) remains active.
To alter the functions automatic start - manual start and with or without cross fault monitoring, the switches S1 and S2 are used. These are located behind the front cover (see unit programming).
The setting with or without cross fault monitoring on E-stop buttons is made with S1. S2 is used to change between automatic an manual restart. On automatic start also the terminals S33 - S34 have to be linked. For connection please see application examples.

ATTENTION - AUTOMATIC START!

According to IEC/EN 60 204-1 part 9.2.5.4.2 and 10.8.3 it is not allowed to restart automatically after emergency stop. Therefore the machine control has to disable the automatic start after emergency stop.

Technical data

Input circuit

Nominal Voltage U_N:	DC 24 V, AC/DC 24 V AC 230 V with variant /105 and /106	
Voltage range	DC	AC/DC
at 10% residual ripple:	0,9 ... 1,1 U_N	0,95 ... 1,1 U_N
at 48% Rresidual ripple:	0,8 ... 1,1 U_N	0,8 ... 1,1 U_N
AC:	—	0,85 ... 1,1 U_N
Nominal consumption:	DC approx. 2 W	
Min. Off-time:	250 ms	
Control voltage on S11:	DC 23 V at U_N	
Control current over S12, S22:	40 mA at U_N	
Min. voltage between terminals S12, S22 and S21:	DC 21 V when relay activated and U_N on A1 - A2	
Short-circuit protection:	Internal PTC	
Overvoltage protection:	Internal VDR	

Output

Contacts	
BG 5925.02:	2 NO contacts
BG 5925.03:	3 NO contact
BG 5925.16:	1 NO, 1 NC contact
BG 5925.22:	2 NO, 1 NC contact The NO contacts are safety contacts. **ATTENTION! The NC contacts 21-22 or 31-32 can only be used for monitoring.**
Operate delay typ. at U_N:	
Manual start:	40 ms
automatic start:	250 ms
BG 5925._ _ /101:	100 ms
Release delay typ. at U_N:	
Disconnecting the supply:	50 ms
Disconnecting S12, S22:	15 ms
Contact type:	positive guided
Nominal output voltage:	AC 250 V DC: see limit curve for arc-free operation

Technical data

Switching of low loads:	≥ 100 mV
(contact 5 µ Au)	≥ 1 mA
(contact AgNi)	≥ 10 mA / DC 24 V
Thermal current I_{th}:	see current limit curve
on 1 contact path:	max. 8 A
on more then 1 contact path:	max. 7 A per contact path
Switching capacity	
to AC 15:	AC 3 A / 230 V IEC/EN 60 947-5-1 for NO contacts AC 2 A / 230 V IEC/EN 60 947-5-1 for NC contacts
to DC 13:	DC 2 A / 24 V IEC/EN 60 947-5-1 for NC contacts
to DC 13 NO contacts:	8 A / 24 V > 10^5 ON: 0,4 s, OFF: 9,6 s
Electrical contact life	
to AC 15 at 2 A, AC 230 V:	10^5 switching cycles IEC/EN 60 947-5-1
to DC 13 at 2 A, DC 24 V:	> 1,5 x 10^5 switching cycles
Permissible operating frequency:	max. 1 200 operating cycles / h
Short circuit strength	
max. fuse rating:	6 A general-purpose IEC/EN 60 947-5-1
line circuit breaker:	C 8 A
Mechanical life:	10 x 10^6 switching cycles

General data

Operating mode:	Continuous operation
Temperature range:	- 15 ... + 55 °C
Clearance and creepage distances	
Overvoltage category / contamination level:	4 kV / 2 IEC 60 664-1
EMC	
Electrostatic discharge:	8 kV (air) IEC/EN 61 000-4-2
HF irradiation:	10 V / m IEC/EN 61 000-4-3
Fast transients:	2 kV IEC/EN 61 000-4-4
Surge voltages between	
wires for power supply:	1 kV IEC/EN 61 000-4-5
between wire and ground:	2 kV IEC/EN 61 000-4-5
Interference suppression:	Limit value class B EN 55 011
Degree of protection:	Housing: IP 40 IEC/EN 60 529 Terminals: IP 20 IEC/EN 60 529
Housing:	Thermoplastic with V0 behaviour according to UL subject 94
Vibration resistance:	Amplitude 0,35 mm IEC/EN 60 068-2-6 frequency 10 ... 55 Hz
Climate resistance:	15 / 055 / 04 IEC/EN 60 068-1
Terminal designation:	EN 50 005
Wire connection:	1 x 4 mm² solid or 1 x 2,5 mm² stranded ferruled (isolated) or 2 x 1,5 mm² stranded ferruled (isolated) DIN 46 228-1/-2/-3/-4 or 2 x 2,5 mm² stranded ferruled DIN 46 228-1/-2/-3

Technical data

Wire fixing:	Box terminal with wire protection, removable terminal strips	
Mounting:	DIN rail	IEC/EN 60 715
Weight:	220 g	

Dimensions

Width x height x depth: 22,5 x 84 x 121 mm

Standard type

BG 5925.03 AC/DC 24 V

Article number:	0049169
• Output:	3 NO contacts
• Nominal voltage U_N:	AC / DC 24 V
• Width:	22,5 mm

Variants

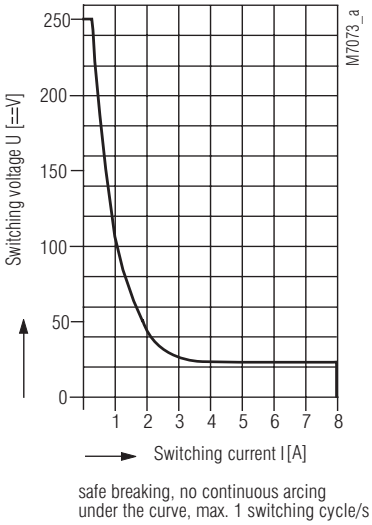
BG 5925._ _/60:	CSA/UL approval
BG 5925._ _/101:	E-stop with fast automatic start without line fault detection on the ON-button
BG 5925._ _/105:	With switch S1 and without crossfault monitoring for AC 230 V
BG 5925._ _/106:	With switch S2 and with crossfault monitoring for AC 230 V
BG 5925.02/113:	Manual restart, with crossfault monitoring for DC 24 V Switching capacity to AC 15: 5 A / 230 V Contact fuse 6 A fast / 4 A slow without internal switches S1 and S2
BG 5925.02/114:	Automatic restart, with cross fault monitoring for DC 24 V Switching capacity to AC 15: 5 A / 230 V Contact fuse 6 A fast / 4 A slow without internal switches S1 and S2

Ordering example for Variants

BG 5925 . _ _ / _ _ _ DC 24 V

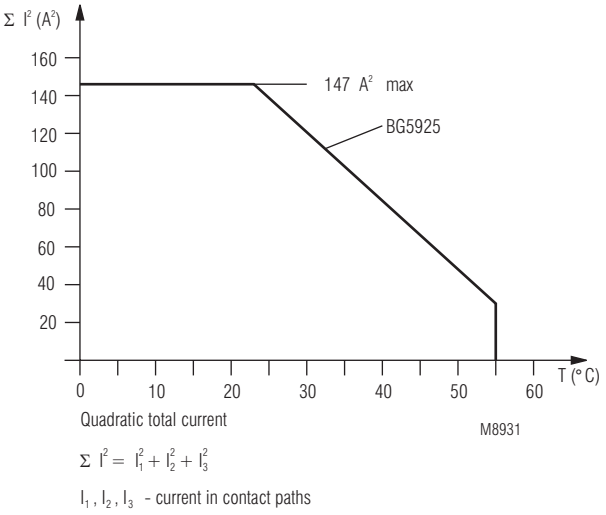
- DC 24 V — Nominal voltage
- _ _ _ — Variant, if required
- _ _ — Contacts
- BG 5925 — Type

Characteristics



safe breaking, no continuous arcing
under the curve, max. 1 switching cycle/s

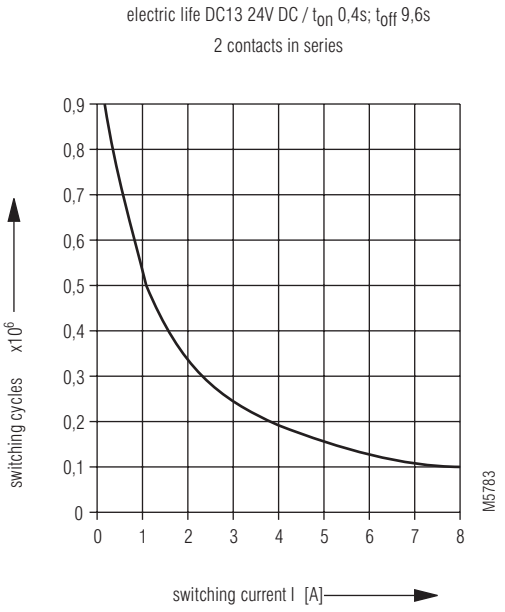
Arc limit curve under resistive load



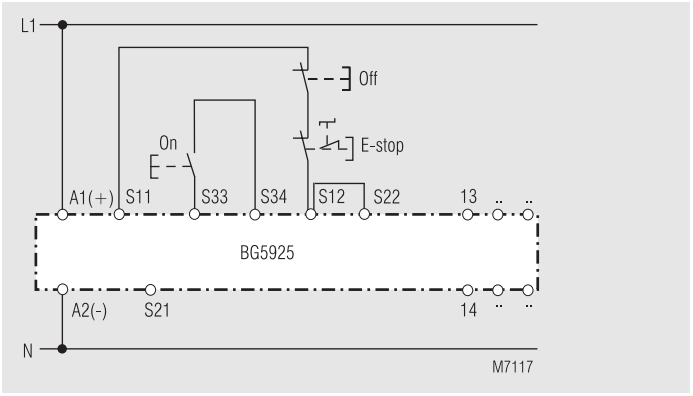
$\Sigma I^2 = I_1^2 + I_2^2 + I_3^2$

I_1, I_2, I_3 - current in contact paths

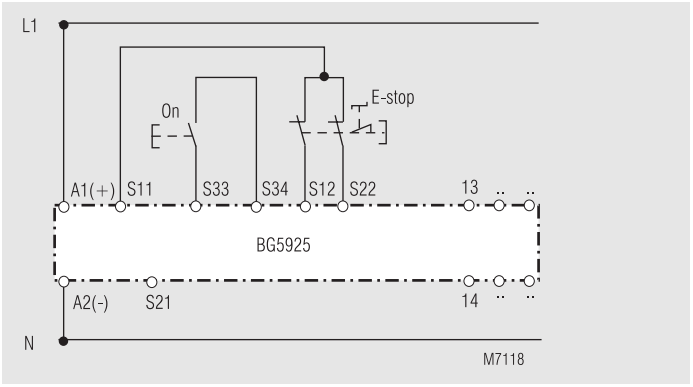
Quadratic total current limit curve



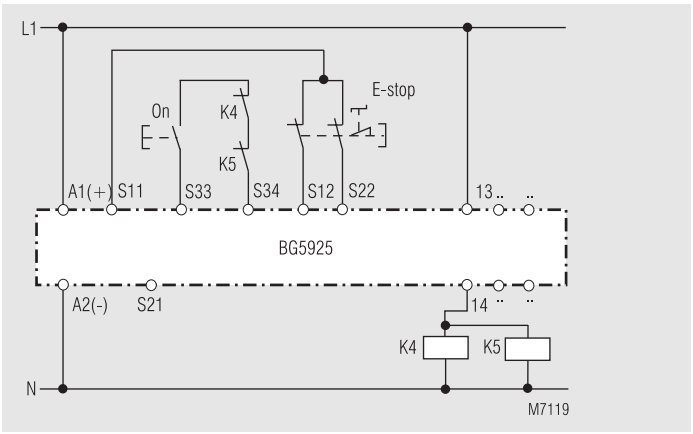
Contact service life



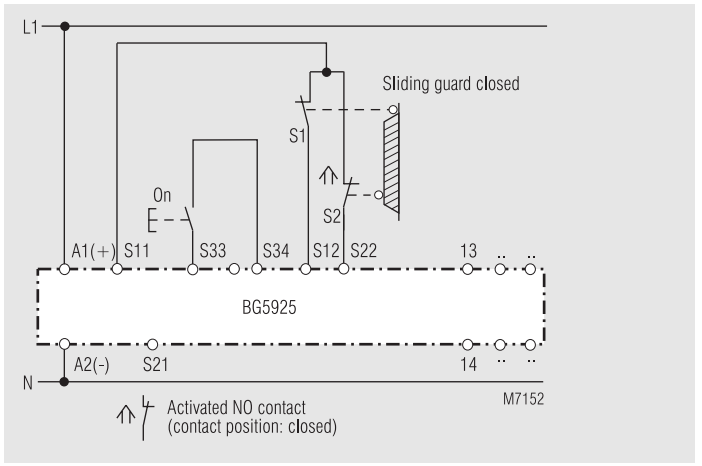
Single channel emergency stop circuit. This circuit does not have any redundancy in the emergency-stop control circuit.
Note: Refer to "Unit programming"!
Switches in pos.: S1 no cross fault detection
S2 manual start



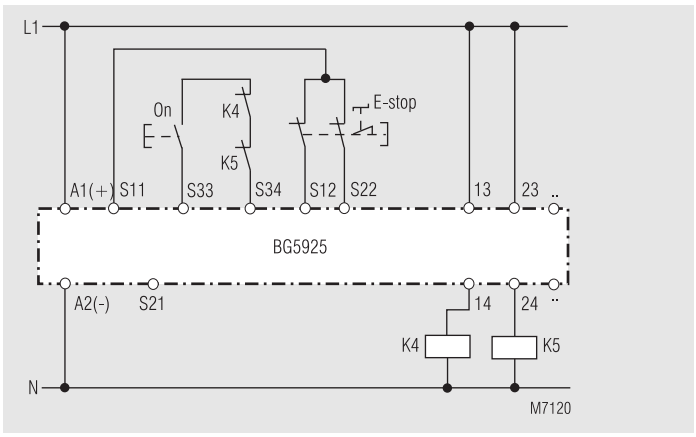
2-channel emergency stop circuit without cross fault monitoring.
Note: Refer to "Unit programming"!
Switches in pos.: S1 no cross fault detection
S2 manual start



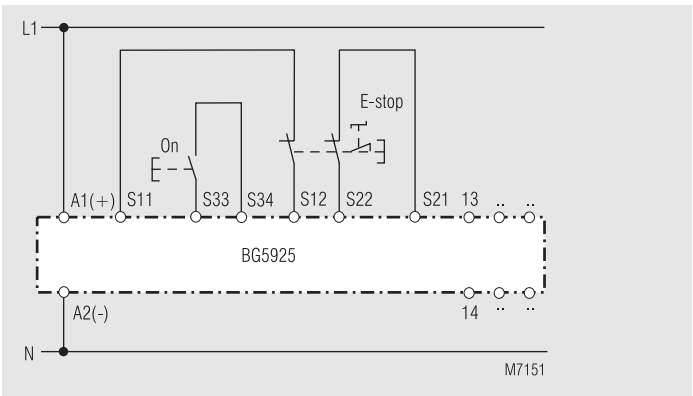
Contact reinforcement by external contactors controlled by one contact path.
Note: Refer to "Unit programming"!
Switches in pos.: S1 no cross fault detection
S2 manual start



2-channel safety gate monitoring.
Note: Refer to "Unit programming"!
Switches in pos.: S1 no cross fault detection
S2 manual start



Contact reinforcement by external contactors, 2-channel controlled.
The output contacts can be reinforced by external contactors with positive guided contacts for switching currents > 8 A.
Functioning of the external contactors is monitored by looping the NC contacts into the closing circuit (terminals S33-S34).
Note: Refer to "Unit programming"!
Switches in pos.: S1 no cross fault detection
S2 manual start



2-channel emergency stop circuit with cross fault detection
Note: Refer to "Unit programming"!
Switches in pos.: S1 cross fault detection
S2 manual start